Exhibit 4

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1   Q.   -- starting with where you attended

2   undergrad.

3   A.   Sure.

4   Q.   Where did you attend undergraduate

5   school?

6   A.   Brigham Young University in Provo, Utah.

7   Q.   And did you obtain a degree there?

8   A.   I did.

9   Q.   What degree was that?

10   A.   I obtained both my bachelor's degree and

11   my master's degree in computer science.

12   Q.   Did you attend any school after receiving

13   your master's degree from Brigham Young?

14   A.   Yes. I attended Rice University for my

15   Ph.D., after I graduated with my master's degree

16   from BYU.

17   Q.   And you obtained a -- a Ph.D there?

18   A.   A Ph.D in computer science.

19   Q.   Do you have any other technical

20   certifications?

21   A.   I do.

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1   Q.   What certifications are those?

2   A.   I have a CISSP, which is a standard

3   certification related to computer security.

4   Q.   And can you ex- -- explain what computer

5   security means in that context?

6   A.   It's fairly broad. It covers everything

7   from appropriate use of cryptography, network

8   architecture, password management, policy, risk

9   assessment.

10   Typically, a CISSP is indicative of being

11   a -- a competent -- I don't want to say senior, but

12   kind of senior person in computer security. A lot

13   of government contracts won't allow a security

14   assessment unless it's signed off by somebody with

15   a CISSP.

16   Q.   Understood. And are you currently

17   employed?

18   A.   I am.

19   Q.   Who -- who is your employer?

20   A.   So, I am both self-employed for my

21   consulting company Crimson Vista, as well as Johns

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1   you work on any projects involving peer-to-peer

2   file-sharing networks?

3   A.   Other than -- other than the report that

4   we will be, I assume, discussing today, I'm not

5   aware of any. I do -- because that was a big part

6   of my research and my Ph.D., I may have considered

7   some other follow-up work, but I don't think any of

8   them materialized.

9   Q.   And you mentioned that -- I believe that

10 peer-to-peer file-sharing networks were part of

11 your Ph.D. work?

12   A.   Yes.

13   Q.   Can you expand on that?

14   A.   Yes. That was -- almost all of my

15 research work was peer-to-peer systems and

16 how -- how peer-to-peer systems incentivized

17 cooperation with each other.

18   Q.   And can you explain what that means in

19 terms of in- -- incentivized cooperation?

20   A.   Sure. So, most networks are centralized,

21 and they have a central point of authority. So,

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1   when you communicate with your bank, your bank is a

2   central authority, and it controls the connection

3   and the communication.

4   In a -- in a peer-to-peer network, the

5   peer-to-peer network only works correctly if the

6   members are cooperating, because there's no central

7   authority to enforce cooperation.

8   As an example. At Rice, we were talking

9   about -- this was before cloud, right? Cloud was

10   not really a thing yet, but we were talking about

11   networks where individuals would join together and

12   cooperatively back up, right?

13   So, I'll take my data. I'll encrypt it,

14   and I'll split it up, and I'll spread it around to

15   other peers in the network, and they'll do the

16   same.

17   If somebody's computer dies, goes

18   offline, is somehow damaged, destroyed, then when I

19   come back, I can pull my encrypted data back off

20   shared drives and get my data back.

21   The problem is, is that from an -- an

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1   incentives' perspective, everybody has an incentive

2   to want to store their data, right? They want the

3   backup for themselves, but they don't necessarily

4   want to use up their own hard-drive space for

5   somebody else.

6   So, how do you design the system so that

7   there are incentives for cooperation? And this was

8   a big part of my research while I was at Rice

9   University.

10   Q.   Okay. And did you do a dissertation at

11   Rice?

12   A.   I did.

13   Q.   What was the topic of that?

14   A.   What was the title? I think it has

15   incentives in the title. I don't remember.

16   Q.   Did the topic involve the cooperative

17   data issues that you were just testifying about?

18   A.   Yes.

19   Q.   Okay. And you said that you were at

20   Harbor Labs, I believe, until 2015; is that

21   accurate?

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1   A.   Correct.

2   Q.   And why did you leave Harbor Labs?

3   A.   I felt that the Ironwood Experts

4   opportunity that I mentioned to take a -- a role as

5   the managing partner looked promising. I knew that

6   it was potentially short term and that the future

7   of the company was not entirely clear, but I

8   decided I wanted to take that opportunity anyway.

9   Q.   And when you say the -- the future of the

10 company was not entirely clear, you were talking

11 about Ironwood Experts?

12   A.   Ironwood Experts.

13   Q.   Okay. Even though you were there for a

14 short time, did you do any consulting at

15 Iron -- Ironwood Experts on the subject

16 of -- subject of peer-to-peer file-sharing

17 networks?

18   A.   I did not.

19   Q.   Okay. So, while you were at Harbor Labs,

20 do you recall being involved in an -- in an

21 analysis of a system called MarkMonitor?

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1   feedback or how that worked.

2   Q.   And prior to working on this analysis,

3   had you ever evaluated any other anti-piracy

4   systems?

5   A.   No.

6   Q.   Did you have any familiarity with

7   anti-piracy systems at that time?

8   A.   Yes. I had general familiarity with work

9   being done by copyright holders throughout the last

10   15 years before this to attempt to identify and

11   discourage the illegal copying of their content.

12   Q.   And how did you obtain that general

13   familiarity with the work being done by copyright

14   holders?

15   A.   Some of it was just knowledge in the CS

16   community. It was a big topic of conversation.

17   Even my senior year of my undergraduate was kind of

18   when -- when a lot of the issues around -- what was

19   the system then -- Napster, and some of those kind

20   of became mainstream, and so there was a number of

21   discussions that went into how do you identify

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1 files and how do you identify who is doing what,

2 and, you know, that was -- those were ongoing

3 topics of conversation just in the community.

4   In addition, as part of my training and

5 networking, and later at -- at Rice, my training in

6 computer security, those are all the kind of

7 underlying topics that go into this kind of

8 analysis.

9   MR. GOULD: Sorry. Can we pause for a

10 moment? We lost the feed on the Live Note.

11   MS. LEIDEN: Okay. Okay.

12   MR. MURPHY: We've been going about an

13 hour anyway, so if we can take a quick break.

14   MS. LEIDEN: Okay. Can we go off the

15 record?

16   THE VIDEOGRAPHER: Stand by. The time is

17 now 3:00 p.m., and we are off the record.

18   (Recess taken -- 3:00 p.m.)

19   (After recess -- 3:09 p.m.)

20   THE VIDEOGRAPHER: The time is now 3:09,

21 and we are back on the record.

                                                          Page 54

1   BY MS. LEIDEN:

2   Q.   Welcome back, Dr. Nielson.

3   A.   Thank you.

4   Q.   Before we took a break, I believe that we

5   were discussing kind of your prior familiarity with

6   anti-piracy systems and peer-to-peer networks; is

7   that accurate?

8   A.   Yes.

9   Q.   Okay. And I believe that you had

10   testified that you had some, essentially, personal

11   experience or research in kind of knowing what

12   those types of systems were prior to beginning the

13   analysis of the MarkMonitor system?

14   A.   Prior to this report, I had familiarity

15   with peer-to-peer systems in general and some

16   understanding of how anti-piracy measures worked.

17   Most of that was, I'd say, academic as opposed to

18   practical.

19   Q.   Okay. And walk me through the timing a

20   little bit. Did any of your consulting work that

21   you had done prior to this Harbor Labs analysis of

Page 55

1   the MarkMonitor system involve anti-piracy systems?

2   A.   My consulting work? None that I'm aware

3   of.

4   Q.   What about peer-to-peer networks, though?

5   A.   At Harbor Labs?

6   Q.   Did any of your consulting work prior to

7   the 2013 report have to do with peer-to-peer

8   networks?

9   A.   Not to the best of my knowledge.

10   Q.   And, again, prior to doing the Harbor

11   Labs analysis of MarkMonitor, were you familiar

12   specifically with BitTorrent?

13   A.   Yes.

14   Q.   And how were you familiar with that?

15   A.   Again, beyond just the -- it was a widely

16   known concept. It was also part of my research for

17   my Ph.D.

18   Q.   And remind me, what year did you obtain

19   your -- your Ph.D. at Rice?

20   A.   2009.

21   Q.   So, that was approximately four years

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1   before the Harbor Labs analysis that we've been

2   discussing?

3   A.   I -- that math seems to work out.

4   Q.   Lawyers can do some math.

5   MR. GOULD: Objection. That was a joke,

6   for the record.

7   BY MS. LEIDEN:

8   Q.   So, in front of you is what we've marked

9   as Exhibit 3 I believe, which is the evaluation of

10   the MarkMonitor AntiPiracy System December 5th,

11   2013, and on the bottom right, it has some Bates

12   numbers, RIAA_127758. That's the document that you

13   have, right?

14   A.   Yes. Correct.

15   Q.   Great. And I want to turn your attention

16   to the bottom of this first page that says,

17   Materials Relied Upon?

18   A.   Yes.

19   Q.   Do you see that there's four bullet

20   points there that Harbor Labs was provided?

21   A.   Yes.

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1   under the stipulated Protective Order entered in

2   this case.

3   THE WITNESS: Dr. Nielson.

4   MS. LEIDEN: What did I say?

5   THE WITNESS: Mr. Nielson. I'm

6   just -- it's fine.

7   MS. LEIDEN: I got the name right this

8   time.

9   THE WITNESS: You did. Good job.

10 BY MS. LEIDEN:

11   Q.   Dr. Nielson, before we took a quick

12 break, we were looking at the section of the report

13 relating to testing. I think that we were on page

14 around 127766. Would you mind flipping back to

15 that?

16   A.   Sure.

17   Q.   Okay. There's a paragraph under the

18 Whole-System Testing section that talks about the

19 downloading that the MarkMonitor system did. This

20 is the paragraph starting, Another example is

21 testing; do you see that?

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1   A.   Yes.

2   Q.   Okay. Would you mind reading that

3   paragraph?

4   A.   For example -- excuse me. I read that

5   wrong. Another example is testing the conjunction

6   of requirements for generating an infringement

7   notice. For example, MarkMonitor requires that at

8   least one full BitTorrent piece be downloaded.

9   This is essential for accuracy. It is -- it also

10 requires that some specified percentage of the data

11 be downloaded.

12   In addition to these, an agent should be

13 subjected to a -- to a test where it receives a

14 full piece, but not enough of the download, and a

15 test where it receives enough of the download, but

16 never a full and complete piece. In both of these

17 cases, such tests would verify that the agent

18 cannot generate an infringement report.

19   Q.   Thank you. And I just want to break that

20 down a little bit. In -- in that first sentence

21 that says, MarkMonitor requires that at least one

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1   full BitTorrent piece be downloaded, --

2   A.   Yes.

3   Q.   -- do you have an understanding of what a

4   BitTorrent piece is?

5   A.   Yes.

6   Q.   And what is that?

7   A.   BitTorrent breaks up a file, usually a

8   very large file, maybe a gigabyte size file, into

9   pieces. It numbers them, and each one has some

10   identification, but you don't necessarily download

11   a complete piece all at once. You can get a chunk

12   of it.

13   When you're doing a BitTorrent download,

14   you're typically downloading from multiple pieces

15   at the same time. So, say that you needed to

16   download 50 percent of a file for -- for the -- the

17   MarkMonitor data "percentage piece." You could

18   conceivably download 50 percent of every single

19   piece, but not have one full complete piece, which

20   is not sufficient.

21   Q.   And why is that not sufficient?

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1   A.   I don't remember, other than that's

2   what's written here. I would assume it's because

3   you need a complete piece for certain identifying

4   information. I think -- I think there is a hash on

5   each piece, which you wouldn't be able to check

6   until you had the complete piece.

7   So, if you downloaded 50 percent of every

8   piece, you still wouldn't know if that was the

9   right data.

10   Q.   Okay. And, perhaps, to refresh

11 your -- your memory, if you'd flip to -- excuse me.

12 Actually, flip back to 127764, just a couple of

13 pages before that, and at the very bottom of that

14 page which starts with Verifiability; do you see

15 that?

16   A.   I do.

17   Q.   And then on the -- the next page, there's

18 a sentence that says, In the case of audio files?

19   A.   Yes.

20   Q.   Would you read that sentence?

21   A.   In the case of audio files, MarkMonitor

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1   relies on a system known as Audible Magic to verify

2   the content. If any vulnerabilities are discovered

3   in Audible Magic, MarkMonitor will inherit such

4   vulnerabilities and, thus, may misidentify benign

5   content as notice-eligible.

6   Q.   And does this record -- refresh your

7   recollection at all in terms of how MarkMonitor was

8   able to verify content?

9   MR. MURPHY: Objection to form.

10   THE WITNESS: If this is related to the

11   previous question about BitTorrent pieces, no,

12   these are unrelated.

13   BY MS. LEIDEN:

14   Q.   Okay. Going back to that

15   question -- the -- what we were talking about in

16   terms of BitTorrent pieces, there's another

17   sentence right after that. I'm on 127766 that then

18   refers to a percentage of the data being

19   downloaded. Is that separate from the BitTorrent

20   piece that is downloaded in the prior sentence?

21   A.   Yes. That's -- that's what I'm

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1   describing, is that -- the way BitTorrent works,

2   you -- you don't necessarily download the file

3   sequentially. You get bits and pieces of -- pieces

4   of it from all over the potentially very large

5   file, and -- so, let me try and explain it one more

6   time.

7   If my memory serves, each BitTorrent

8   piece has a separate hash. I think that's right.

9   I think each BitTorrent piece has a hash.

10   When you're downloading a file, you'd

11   like to know that you're downloading the right

12   file, even if -- forget legality for a minute.

13   Suppose I'm just downloading a Linux

14   Kernel that's free for download. I want to make

15   sure that -- that the other people participating

16   are not uploading false data claiming that it's

17   part of the Linux Kernel.

18   So, each piece -- and there can be

19   thousands, right? You might have 2,500 pieces in

20   a -- in a download. Each one has a little

21   fingerprint, but you don't necessarily even

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1   download a complete piece all at once.

2   You might download a chunk of a piece,

3   and then another chunk of a piece, but once you get

4   the whole piece, you can check the fingerprint to

5   see if it's correct data or not.

6   Separately there's the amount of the

7   download you have so far, regardless of whether or

8   not any of the pieces have been fully completely

9   downloaded.

10   So, again, as I said earlier, if you

11   downloaded half of every piece, you would have 50

12   percent of the data, but you would not have any

13   complete pieces yet on which you could check the

14   fingerprint.

15   Q.   Understood. And coming back to

16   the -- the section of the report that we were

17   looking at that you had read, why did Harbor Labs

18   recommend that, in addition to those downloads that

19   are referenced there, that the testing be done

20   where -- where it receives a full piece, but not

21   enough of a download, and then enough of the

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1   record.

2   THE VIDEOGRAPHER: Stand by. The time is

3   now 4:54, and we are off the record.

4   (Recess taken -- 4:54 p.m.)

5   (After recess -- 4:56 p.m.)

6   THE VIDEOGRAPHER: The time is now 4:56,

7   and we are back on the record.

8   CROSS-EXAMINATION

9   BY MR. GUERRA:

10   Q.   Good afternoon, Dr. Nielson. My name is

11   Andrew --

12   A.   Good afternoon. Sorry.

13   Q.   My name is Andrew Guerra. I represent

14   the Plaintiffs in this action. I just have a few

15   questions for you. Hopefully, we'll be quick.

16   Earlier you testified -- testified about

17   some time you spent working on BitTorrent; is that

18   right?

19   A.   Yes.

20   Q.   What was the nature of your work with

21   BitTorrent?